NORTH PACIFIC OCEAN

By WILLIS E. HURD

Following upon the abnormally low pressures observed in January over a considerable part of the North Pacific east of the 180th meridian, February witnessed a decided return toward normal between the Hawaiian Islands and the United States. Here the usual great anticyclone, which had disappeared by the close of January, began slowly to recover early in February, though it was not until the middle of the month that it occupied the greater part of its average area. In the Gulf of Alaska and over the entire Aleutian region the remarkable condition of very low pressures continued, though with a slow return toward normal by the last third of the month, this trend being more rapid north than south of the Aleutian chain itself. The center of the huge cyclonic area continued, as in January, to be at Dutch Harbor, where the departure from average was still considerable, being minus 0.42 inch. It is to be noted that the highest pressure readings at both Dutch Harbor and Kodiak still remained below 30 inches.

The following table gives data in this particular:

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean, February, 1926*

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Dutch Harbor [1]	29.20	−0.42	29.84	23d [4]	28.26	1st.
St. Paul [1]	29.52	−.14	30.22	24th	28.74	2d.
Kodiak [1]	29.32	−.38	29.72	11th [4]	28.58	4th.
Midway Island [1]	29.98	−.05	30.26	9th [4]	29.68	6th.
Honolulu [2]	30.06	+.01	30.20	9th	29.83	6th.
Juneau [3]	29.59	−.33	30.09	27th	28.85	4th.
Tatoosh Island [2 3]	29.90	−.08	30.54	25th	29.22	2d.
San Francisco [2 3]	30.07	.00	30.35	24th	29.52	11th.
San Diego [2 3]	30.06	+.02	30.33	4th	29.70	1st.

[1] P. m. observations only.
[2] A. m. and p. m. observations.
[3] Corrected to 24-hour mean.
[4] And other date.

Along the greater part of the coast of China high pressure prevailed, with only a few cyclones struggling through. Lows were moderately frequent and active over and to the east of Japan, and gales of considerable intensity accompanied the movements of some of them into the Pacific. The highest wind reported from this region occurred on the 5th, near 39° N., 147° E., where a storm of force 11 from the north was experienced by the Japanese steamship *Tokiwa Maru*, bound for Victoria. Moderate to whole gales occurred upon several other days, but they decreased in frequency over the whole western half of the ocean toward the end of the month.

Although as a whole the eastern HIGH attained nearly its normal development, yet two fierce storms raged over a considerable part of its usual area, and directly in the paths of steamships plying between Honolulu and the California ports. These violent disturbances were therefore experienced by a greater number of vessels than usually encounter individual storms over any part of the North Pacific. The earlier of the two was at its height on the 1st and 2d of the month. On these and the three or four following dates the lowest pressure readings of February occurred over most of the eastern part of the ocean. The principal LOW center on the 1st and 2d lay over the central Aleutians, but a secondary cyclone was developing to the southward on the 1st, and by the morning of the 2d lay near 38° N., 132° W., with whole gales to storm winds from westerly to southerly directions blowing over a wide area south of the new center on both dates. The secondary LOW moved northward off the coast, with rapidly falling pressure, but also decreasing energy, and on the 4th merged with the northern LOW which then lay across the northern part of the Gulf of Alaska.

Light to moderate winds henceforth prevailed over the scene of the earlier storm until the 10th, when a fresh cyclonic development occurred near 38° N., 140° W. This LOW moved slowly toward the California coast, until on the 11th and the morning of the 12th whole gales to hurricane winds swept much of the eastern half of the area traversed by the Honolulu–San Francisco steamers. After noon of the 12th the storm rapidly diminished, and in a day or two had lost its identity and become merely a part of the inactive lower extension of the Aleutian trough.

Along the northern steamer routes no reported gales exceeded 10 in force. These were met with on scattered dates mainly in the eastern and western regions, since over the upper central part of the ocean gales exceeding 8 in force were rare, though here lay the oscillating center of the permanent cyclonic formation.

From the Far East there is slight information at hand as to the existence of a depression, or typhoon, which apparently originated in the lower China Sea on the 4th. The cyclone seems to have moved northward, since there are reports of rough weather north and northeast of Luzon on the 5th and 6th. The American tanker *Meton*, leaving Manila on the 3d, bound for Los Angeles, reported a pressure reading of 29.02 inches on the 5th, in 19° 25′ N., 120° 30′ E., accompanied by squally weather and a maximum wind force of 8, ENE.

In the American Tropic there were several days with strong northeasterly gales reported, especially on the 20th and 27th in the Gulf of Tehuantepec, and on the 7th and 19th near 10° N., 85° W. The accompanying barometric depressions were slight. In the early meteorological history of the lower Central American coast and adjacent waters of the Pacific, frequent tornadoes were spoken of as occurring at night. While the name as then used probably applied to the more or less common severe local squalls of this region, yet there is now at hand a report—the first of the kind received in recent years—of a violent local whirl which was observed by the British steamer *Toco*, and thus briefly mentioned:

> At 2 a. m., L. M. T., February 4, in Lat. 6° 17′ N., 95° 25′ W., vessel passed under a low-lying Cu.-Nb. cloud and experienced a small whirlwind of hurricane force, lasting but a few minutes.

At Honolulu the weather was generally pleasant and somewhat warmer than usual for February, and only four days were colder than normal. The prevailing wind continued from the east, with a maximum velocity of 36 miles an hour from the NE. Precipitation was light, the total being only 0.44 inch, which is 3.31 inches less than the average. At Juneau the month was also warm, though precipitation was above the average. San Diego reported the second warmest February since the establishment of the station in 1871.

Fog was extraordinarily rare over the high seas this month, except off the coast of California, where it was reported on 10 days. Mention was made of the exceptional lack of fog in the Strait of Juan de Fuca. Well at sea in west longitudes widely scattered fog was observed on four days. In east longitudes the only mention of the phenomenon comes from a vessel which reported it on the 21st and 22d in the neighborhood of Shanghai.

MISCELLANEOUS PHENOMENA

Mirage off Farallon.—On the afternoon of February 26, 1926, when in vicinity of Piedras Blanco's Light and to north of it, a very noticeable mirage was in effect to the northwestward and inshore. Ships and shoreline were distended in various grotesque shapes, and visibility greatly increased. Heat waves could be seen plainly rising from the water; upper atmosphere exceptionally clear. When below Pigeon Point, the Farallon Islands Light showed above horizon as two distinct lights, one above the other, for an hour, then disappeared, and did not show again until within its limit of visibility. Distance seen 45 miles at pickup.—*Communicated by American S. S. "H. M. Storey," New York to San Pedro.*

Haze off Australian coast.—The haze observed on the 17th, 18th, and 19th of February was caused by the bush fires then raging over hundreds of miles of land in Australia. It was first observed when the Australian coast was over 900 miles distant, and became more dense as we approached the land. The haze was of a reddish color, and on the 19th it completely obliterated the horizon, and gave the sun the appearance of a red ball at noon.—*From report by British S. S. "Tahiti," Papeete to Sydney.*

DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The weather of the current month was characterized by abnormally high temperature, especially in the Northwest and by temperature above normal elsewhere in the United States, except in New England—see Chart III of this REVIEW.

The warm weather was probably closely related to the atmospheric pressure distribution over the northeastern Pacific and contiguous land areas over which it was considerably below the normal.

Incursions of cold air from high latitudes were, therefore infrequent and of short duration.

Cyclonic storms passing over the Atlantic in the neighborhood of the Canadian Maritime Provinces had a tendency to greatly increase in intensity as in the previous month. The usual details follow.—*A. J. H.*

CYCLONES AND ANTICYCLONES

By W. P. DAY

Twenty low-pressure areas were plotted during the month, seven of which were of the so-called Alberta type. These Alberta storms, however, could generally be traced back across the Pacific Ocean to southeastern Asia. The remaining LOWS moved inland from the Pacific or originated over the South and Southwest. The latter type developed into important storms east of the Mississppi River.

The 15 HIGHS were about equally divided between the oceanic type moving inland from the Pacific and the continental type moving southward from Canada. None of these HIGHS, however, was important.

FREE-AIR SUMMARY

By V. E. JAKL

Free-air temperatures were above normal at all aerological stations, except due west, where they were about normal. (See Table 1.) The excess over normal increased in general from southern to northern stations, but was most pronounced in the northwest, as shown by Drexel and Ellendale. At those stations the departure was between 4 and 5 degrees above normal in about the first 1,000 meters altitude, but diminished thence upward until nearly normal temperatures were recorded above 3,000 meters. Over Broken Arrow, Groesbeck, and Royal Center the departure was about uniform with altitude and was greatest over Broken Arrow. The large excess over normal and its diminution with altitude in the upper levels over Drexel and Ellendale may be attributed to a less than usual frequency of cold waves over these stations, a characteristic of which, over northwestern sections, is to cause inverted lapse rates or at least an approximately isothermal state to considerable altitudes.

Relative humidities, as usually the case with temperatures above normal, were in general below normal. This departure was more especially evident in the upper levels, although departures at no station were pronounced enough to show any significant relation with other free-air conditions.

Free-air resultant winds were of about normal direction, being nearly west at all stations and at practically all altitudes. (See Table 2.) The general tendency, however, was for a slight north component, although over Ellendale the winds were quite decidedly northwest, except that in the lower levels where the positive temperature departure was greatest the winds were west-northwest, instead of the normal northwest direction. In the lower levels at a number of stations, particularly the more southerly, there was a slight south component.

It is significant of the rapid movement of HIGHS and LOWS, which continued from the previous month, that the free-air movement was stronger than normal, and that the resultants not only showed a general west direction, but that wind directions from day to day showed comparatively few exceptions to a west component for all stations and altitudes. Easterly winds in fact were almost entirely absent, only Key West showing pronounced east component to any considerable altitude, and that on only a few days. Resultant velocities were generally above normal throughout the vertical extent of observations at all stations. This was noticeably the case over Due West in the upper levels, where velocities were in excess of the normal as well as greater than those at any other station. Incidentally, Due West has in the upper levels the highest normal velocities for February of all the stations.

An example of some of the high velocities observed during the month is given by the records of the 25th, when the deep LOW centered over Chicago was effective in giving high velocities aloft to stations as remote from the center as Broken Arrow, Due West and Groesbeck, where winds from a general westerly direction ranging from 37 to 44 meters per second were recorded at various altitudes from 1,800 to 5,200 meters. This LOW had its effect on velocities aloft in the United States even after its center had passed east of Newfoundland on the 27th, as shown by observations on that date at Broken Arrow, Drexel, Due West, Ellendale, Madison, and Royal Center. The maximum free-air velocities recorded at these stations are approximately indicated by those reported from the extreme stations, Due West and Ellendale, which ranged from 53 meters per second from the west-northwest at 6,500 meters, to 31 meters per second from the northwest at 4,000 meters, respectively.